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FAILURES IN FPD ? A CLINICAL SURVEY

Prosthodontics

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ABSTRACT

The failures in fixed partial denture are conditions that occur during or after appropriately performed fixed prosthodontics treatment procedures. failures in fixed prostho-dontics can be divided into biological, mechanical and esthetic factors of varied age group. The present study was conducted to assess biological, mechanical, and esthetic failure factors among fixed partial dentures (FPDs). A cross-sectional study was conducted among patients who reported to the Department of Prosthodontics, Rajarajeswari dental college and hospital , bengaluru, Karnataka, India who had complain regarding failures in fixed partial denture A total of 100 fixed partial denture failures in subjects were assessed. The fixed partial denture was examined for the failure factors (biological, mechanical, and esthetic). Each patient was examined clinically and questionnaires were provided to examiner in concern with failures of fixed partial denture.The result showed out of 100 fixed partial denture failures, 27% of it showed the biological failure, 39% showed the mechanical failure and 34% showed esthetic failure. The most frequent reason for failure was mechanical factors followed by biological,esthetic failure and biologic failure.The occlusal problem was the most common biological failure factor, the loss of retention was the most common cause of mechanical failure factor and the over contoured was accounted more when compared to other esthetic failure factors. **Clinical significance:** By knowing the type of failures, we can plan a proper treatment plan so that the abutment will have a long time prognosis.

KEYWORDS

Biological Failure, Esthetic Failure, Fixed Partial Denture Failure, Mechanical Failure, Food Lodgement,fracture Of Bridge.

INTRODUCTION

Diagnosis of the type of defect at the edentulous site, the condition of the abutment teeth, the root surface area, the cross-section, crown-root ratio, span of edentulism, gingival recession, bone loss, and stability of th eabutment teeth should generally be taken into account.[1]

However, a clear determination of specific guidelines and communication of precise information to the technician about the desired FPD design by dental practitioners are often seen lacking. When unable to treat recurring cases of food impaction related to FPD prostheses in the practice, general practitioners often consult a specialist for its management. [2] Prosthodontist plays a major role in preventing and treating food impaction by delivering biocompatible prostheses, with emphasis on and attention to important clinical and biological aspects to avoid tissue damage.[3]Biological failure factors like caries,tender on percussion, food lodgement, periapical pathology, mobility in abutment, occlusal problem.

Mechanical failure factors like loss of retention, dislodgement of crown or bridge, fracture of bridge or connector failure, coronal tooth fracture, occlusal wear of prosthesis or perforation of the prosthesis and porcelain fracture were examined. Esthetic failure factors like unacceptable color match evaluated by comparing with the adjacent teeth or by the patient complaint, over/under the contoured margin of restoration, inadequate marginal fit [1] Hence the study is been conducted to assess reason for failure among fixed partial dentures .

MATERIALS AND METHODS

A cross-sectional study was conducted among the patients complaining about FPD. The subjects were selected from the Department of Prosthodontics, rajarajeswari dental college and hospital,bengaluru.

I. A total of 110 FPD failures in subjects who were fulfilling the inclusion criteria of the study were selected.
II. The subjects were requested to fill in the consent form and participate in the study.
III. Questionnaire and clinical examination were performed personally for each subject.
IV. The subjects were evaluated for mechanical, biological, esthetic factors by prosthodontist

Biological failure factors affecting like caries, tender on percussion, food lodgement, periapical pathology, mobility in abutment,occlusal problem .Mechanical failure factors like loss of retention, dislodgement of crown or bridge, fracture of bridge or connector failure, coronal tooth fracture, occlusal wear of prosthesis or perforation of the prosthesis and porcelain fracture were examined. Esthetic failure factors poor shade selection, over/under the contoured margin of restoration, metal exposure in cervical area [4]. The data collected were then subjected to statistical analysis.

RESULT.

Table 1 shows distribution between age and type of failure . 110 individuals 49 were aged between 21 to 30 yrs showed high esthetic failures, 41 were aged between 31 to 40 yrs showed biologic and mechanical failure and 20 subjects were aged between 41 to 50 yr showed high mechanical failure, Chi-square test showed statistically significant association between age and type of failure (χ^2=31.6, p=0.002).

Table 2 show distribution of material used and type of failure out of 110 samples 47 subjects had PFM crowns followed by 28 had Zirconia crowns, 18 had Ceramic facing crowns and 17 had metal crowns Chi-square test showed statistically significant association between material used and type of failure (χ^2= 36.47 p=0.006)

Table 3 shows distribution of the subjects based on patient's complaints, Out of 110(100%) subjects, 41(37.3%) had compliant of ill-fitting prosthesis, 35(31.8%) had complaint of not satisfied with aesthetics, 34(30.9%) had complaint of fracture/chipped restoration, 17(15.5%) had pain and 14(12.7%) had food lodgement.

Table 4 shows distribution of the subjects based on type of failure ,Type of highest mechanical failure was loss of retention- 45(40.9%) followed by perforation of prosthesis and coronal teeth fracture-30(27.3%), followed with biologic and aesthetic failure.

Table 1: Distribution between age and type of failure

Type of failure		Age groups			Total
		21 to 30 yrs	31 to 40 yrs	41 to 50 yrs	
Mechanical	Count	13	12	9	34
	%	26.5%	29.3%	45.0%	30.9%
Mechanical, Aesthetic	Count	1	4	0	5
	%	2.0%	9.8%	0.0%	4.5%
Mechanical,Aesthetic, Biological	Count	1	1	1	3
	%	2.0%	2.4%	5.0%	2.7%
Mechanical, Biological	Count	8	14	9	31
	%	16.3%	34.1%	45.0%	28.2%
Aesthetic,	Count	19	8	0	27
	%	38.8%	19.5%	0.0%	24.5%
Aesthetic, Biological	Count	7	0	0	7
	%	14.3%	0.0%	0.0%	6.4%
Biological	Count	0	2	1	3
	%	0.0%	4.9%	5.0%	2.7%
Total	Count	49	41	20	110
	%	100.0%	100.0%	100.0%	100.0%
Chi-square value-31.6					
p value=0.002*					

Table 2 Distribution of material used and type of failure

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Type of failure		Material Used				Total
		Metal	Ceramic facing	PFM	Zirconia	
Mechanical	Count	8	7	13	6	34
	%	47.1%	38.9%	27.7%	21.4%	30.9%
Mechanical, Aesthetic	Count	0	0	5	0	5
	%	0.0%	0.0%	10.6%	0.0%	4.5%
Mechanical,Aesthetic, Biological	Count	0	1	1	1	3
	%	0.0%	5.6%	2.1%	3.6%	2.7%
Mechanical,Biological	Count	6	8	13	4	31
	%	35.3%	44.4%	27.7%	14.3%	28.2%
Aesthetic,	Count	2	1	13	11	27
	%	11.8%	5.6%	27.7%	39.3%	24.5%
Aesthetic, Biological	Count	0	0	1	6	7
	%	0.0%	0.0%	2.1%	21.4%	6.4%
Biological	Count	1	1	1	0	3
	%	5.9%	5.6%	2.1%	0.0%	2.7%
Total	Count	17	18	47	28	110
	%	100.0%	100.0%	100.0%	100.0%	100.0%
Chi-square value- 36.47 p value-0.006*						

Table 3: Distribution of the subjects based on patient's complaints

Patient's complaints		Frequency	Percent
Aesthetically unsatisfactory	NO	75	68.2
	YES	35	31.8
Pain	NO	93	84.5
	YES	17	15.5
Fracture/Chipped restoration	NO	76	69.1
	YES	34	30.9
Food lodgement	NO	96	87.3
	YES	14	12.7
Ill-fitting prosthesis	NO	69	62.7
	YES	41	37.3

Table 4 Distribution of the subjects based on type of failure

Type of Failure		Frequency	Percent
Mechanical failure	Loss of retention	45	40.9
	Porcelain fracture	21	19.1
	Fracture of bridge	22	20.0
	Perforation of prosthesis	30	27.3
	Coronal teeth fracture	30	27.3
Aesthetic failure	Unacceptable shade	17	15.5
	Over contoured Crown	18	16.4
	Under Contour Crown	2	1.8
	Metal exposure in cervical area	14	12.7
Biological failure	Caries	14	12.7
	Periapical pathology	6	5.5
	Mobility of abutment	10	9.1
	Occlusal problem	30	27.3
	Food lodgement	31	28.2

DISCUSSION:

There are increased tendency of providing various treatment modalities like removable prosthesis, implantology, and conventional bridge prosthesis to older age individuals .based on psychological consideration patient prefer fixed prosthodontic treatment option over removable type.[5-7] the practice of fixed prosthodontics therapy may cause a certain percentage of unsatisfactory outcome which results in failures when biological demands are not met. fixed prosthesis failure can occur in due course due to various reasons which may be divided into biological failures, mechanical failures and esthetic failures.[2]Therefore it is necessary to sort the etiological factors which will aid in the management of FPD failures. The prognosis can be good when causative factor for failure is been known earlier to prevent any further complication.. So, the study was carried out to identify the factors responsible for the failure of FPDs.

The present study was conducted among the patients who underwent Fixed denture prosthetic treatment. The subjects were selected from rajarajeswari dental college and hospital, department of prosthodontics, Karnataka, India. A total of 110 FPD failures in subjects were selected. The subjects requested to fill in the consent form and participate in the study. The subjects were evaluated for failure factors namely biological, esthetic mechanical failures based on age,material and patients complaint .Data were obtained and subjected to statistical analysis. In this study,

Graph 1 shows distribution between age and type of failure, older individuals mainly complained of mechanical and biologic failure,and younger individuals of esthetic failure .The study conducted by Walton et al. on failure factors where mechanical problems accounted more compared to biological and esthetic failures.

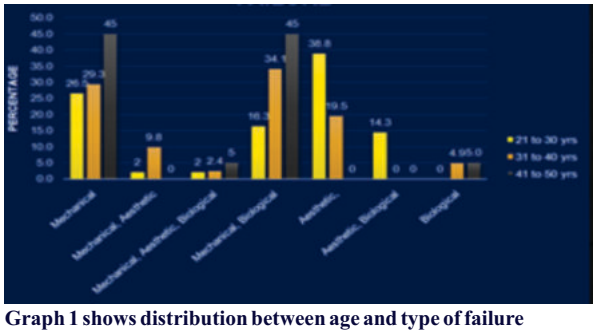
Graph 2 represented the distribution of material used and type of failure, most of metal crown and porcelain fused to metal showed mechanical and biological failure. Zirconia crown showed more of esthetic failure because of poor preparation and improper shade selection.

Graph 3 represented distribution Based on patient complaint subjects, majority had compliant of ill-fitting prosthesis, following with complaint of not satisfied with aesthetics and had complaint of fracture/chipped restoration, pain and had food lodgement. The studies conducted by Cheung,13 Karlsson in which the loss of retention was the primary cause of failure. The study conducted by Valderhaug shows similar results.

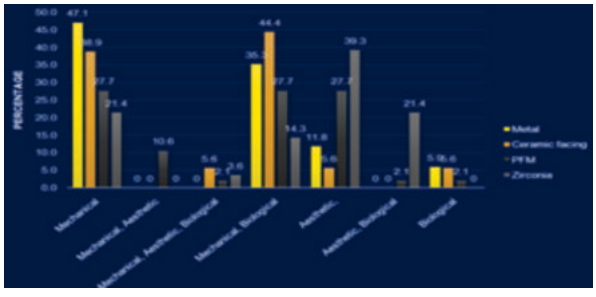
Graph 4 represent distribution of the subjects based on type of failure, highest failure observed was loss of retention in mechanical failure. The mechanical failure might be due to the cementation failure and excessive taper of abutment tooth resulted in poor resistance form of retainer.[10]

In biologic failure food lodgement was more commonly seen, under radio graphic inspection showed caries in the region of complaint,in various studies major reason for the failure of fixed bridge prostheses was cares.[7-10]

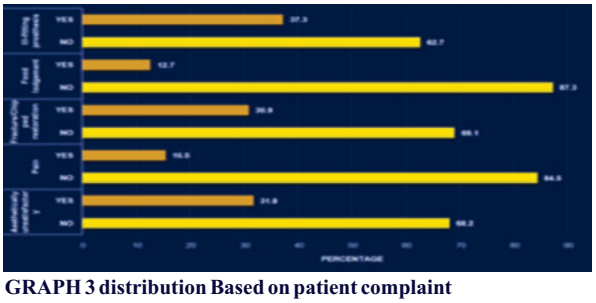
In esthetic failure majority of individuals had problems in over contoured crown of about 16% and following with had inappropriate shade selction . In the esthetic failure the zirconia restorations more often fail esthetically than mechanically or biologically.



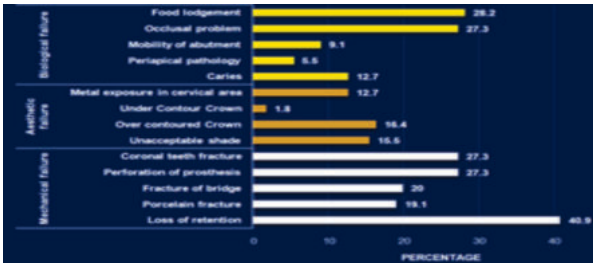
Graph 1 shows distribution between age and type of failure



Graph 2: distribution of material used and type of failure



GRAPH 3 distribution Based on patient complaint



GRAPH 4: distribution of the subjects based on type of failure

CONCLUSION:

Highest failure observed was mechanical failure with loss of retention of prosthesis. Food lodgement and caries was observed biologic failure ,over contoured and poor shade matching was common esthetic failure. With the advancements in digital technologies and latest materials, we have a wide range of treatment options in fixed prosthodontics that will meet the changing demands of esthetics and function. Furthermore, with the latest developments, there is an obvious shift to less invasive dental treatments. Recent innovations such as robotics and lasers have revolutionized the fixed prosthodontics which aids in lowering the failures experienced by patients.

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